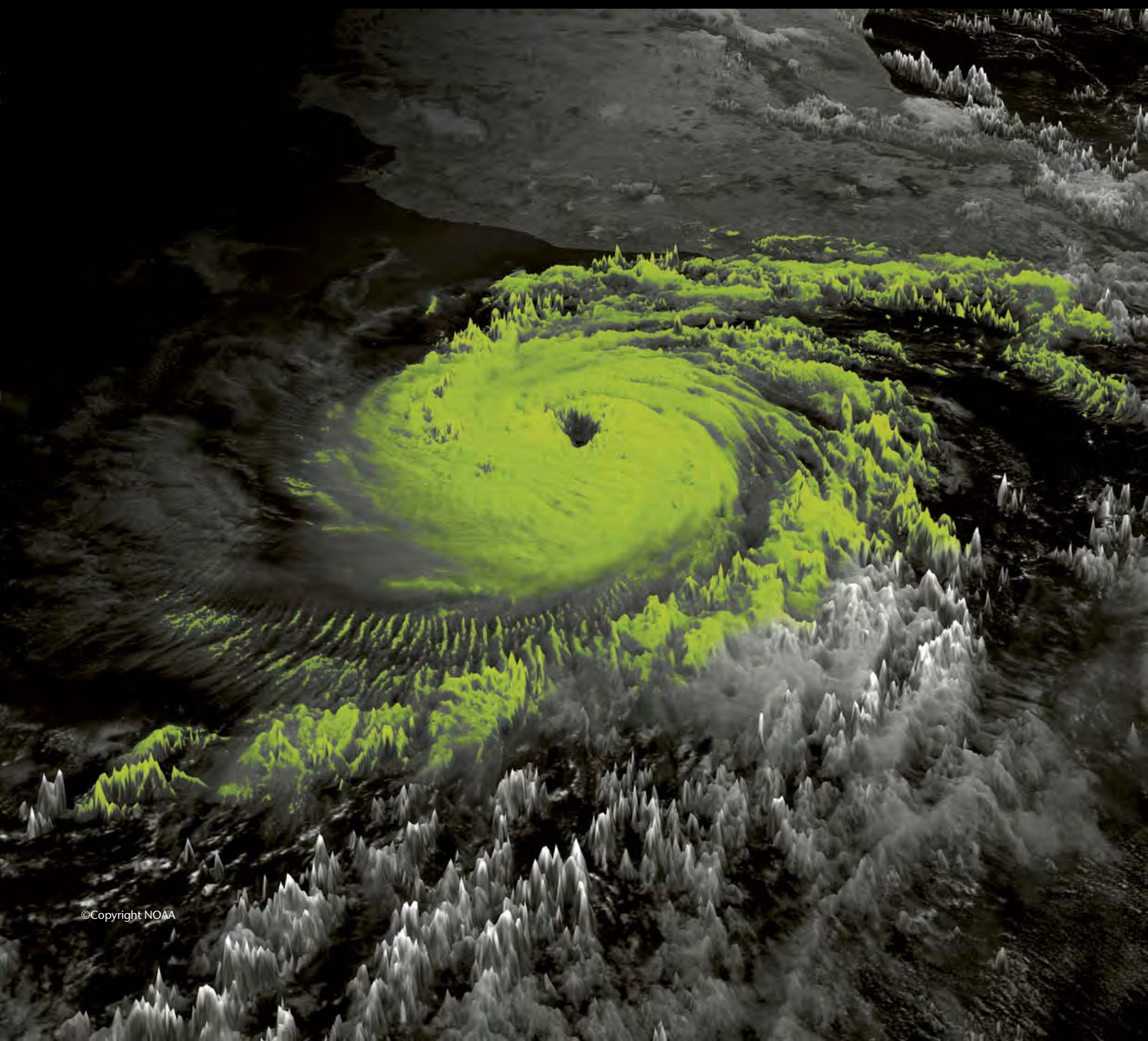


Met Office

StormTracker

User guide v3



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Notes on the use of StormTracker

StormTracker is not designed for use for decision-making where there is a risk to life and limb. It is designed to give a fuller picture than other storm tracking software available, by showing several models in one place and many different scenarios of how the weather will evolve. This is useful if you are making financial or business decisions based on many possible scenarios happening.



The Met Office strongly advises that if you need to make a decision on storm information that could affect safety, you visit the website of the meteorological centre for the region you are interested in. A list of these can be found on our public website at:
www.metoffice.gov.uk/weather/tropicalcyclone/warnings

Please see the section on **Data provenance** for guidance on the accuracy, limitations and advised use of the information in StormTracker.

Please note that the Met Office can accept no responsibility for the accuracy or content of data supplied to us by other modelling centres and strongly advises that you read your terms and conditions carefully.

Introduction

StormTracker is a tool designed to help you understand risks and forecasted scenarios for tropical storms around the world. It is designed for users who need to understand in advance of the usual 3 – 5 day forecasts the range of predicted outcomes of severe tropical weather. It enables comparison of different forecasts, combinations of forecasts, observed latest weather and historical storms to enable users to compile a complete picture of risks.

Content includes:

- 1 x forecast weather layer (UK deterministic 5 day storm track).
- 1 x observed track.
- 3 x latest weather layers:
 - cloud (IR and Visible satellite).
 - sea surface temperatures.
- Thousands of historic storms (HURDAT data from 1850 until the present).

System requirements

1. System requirements

System requirements and settings

For optimum viewing your computer requires the following settings:

Minimum spec:

- 1000 Mhz processor
- 1GB RAM
- Flash Player 10
- Web browser
- Internet connection

Recommended spec:

- 1000 Mhz processor
- 2 GB RAM
- Flash Player 10
- Internet Explorer
- High speed broadband or better

This service is supported in the following browser/operating system combinations:

- Microsoft Internet Explorer version 5.5 or above (Microsoft Windows/Apple Macintosh)
- Mozilla Firefox version 2.0 or above (Microsoft Windows/Apple Macintosh)

2. Browser plugins

This service requires the Adobe Flash Player plugin, version 10 or above.
This plugin can be obtained from www.adobe.com/go/getflashplayer

3. Starting and initialising

Once registered, launch your Internet browser, then enter the web address for StormTracker: **www.metoffice.gov.uk/premium/stormtracker** into the address bar, this will launch and present the login page.

Using StormTracker

1. Log-in and registration

Before you use StormTracker you need to register.

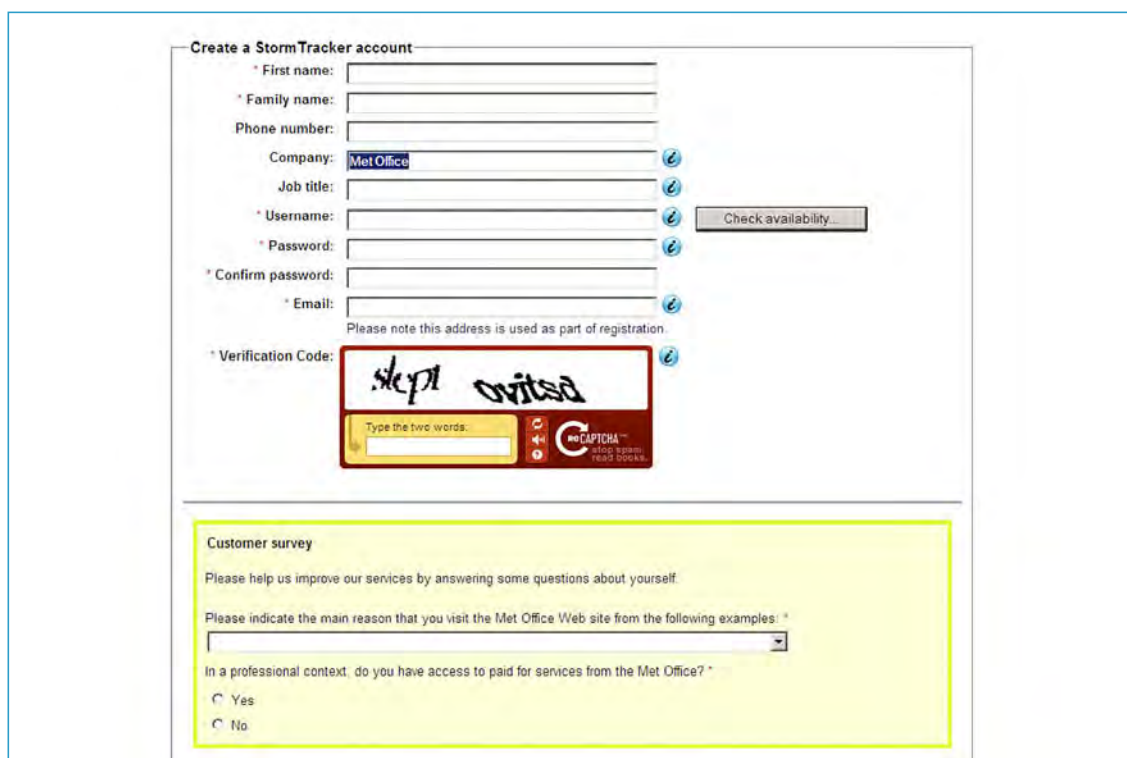
For brand new users:

<https://register.metoffice.gov.uk/WaveRegistrationClient/register.do?service=stormtracker>

For existing Met Office registered users for other products:

<https://register.metoffice.gov.uk/WaveProfileManagementClient/registerstormtracker.do?service=stormtracker>

When you first click on the link to StormTracker, you will see the registration screen like this:



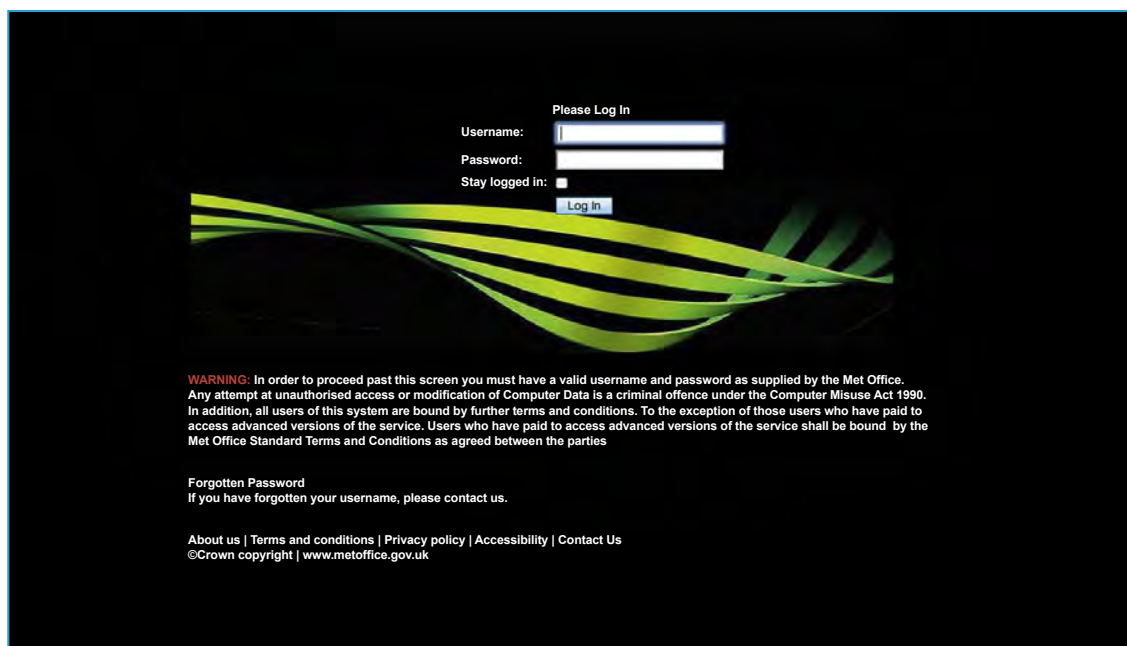
The screenshot shows the 'Create a StormTracker account' registration form. It includes fields for First name, Family name, Phone number, Company (pre-filled with 'Met Office'), Job title, Username, Password, Confirm password, and Email. A 'Check availability...' button is next to the Username field. Below the email field is a note: 'Please note this address is used as part of registration.' The Verification Code section shows a CAPTCHA image with the words 'step' and 'ovitsa' and a text input field. Below the registration form is a 'Customer survey' section with a yellow background, asking for feedback on the service and the reason for visiting the Met Office website.

You must register your name and email address and check the box stating your marketing preference to see any content on StormTracker. As part of registration you will be directed to the Registered Content License, which you must agree to before clicking on the Register button.

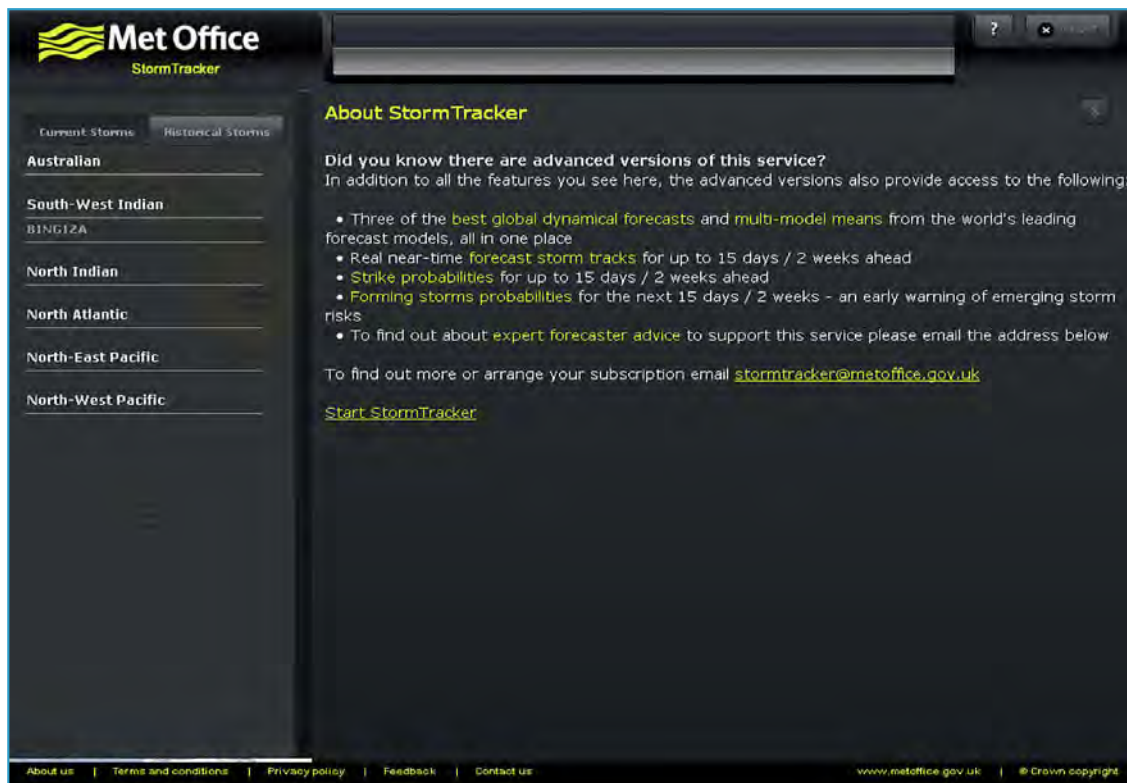
You will then be sent an email confirming your User Name and Password with which you can log in. Close your browser and re-open it, typing in the address of the product as in the Introduction: www.metoffice.gov.uk/premium/stormtracker. This will now direct you to the Log-in screen.

Using StormTracker *continued*

Log-in details for StormTracker

The image shows the StormTracker login interface. It has a dark background with a green and yellow wavy graphic. The login form includes fields for 'Username:' and 'Password:', a 'Stay logged in:' checkbox, and a 'Log In' button. Below the form is a 'WARNING' section with legal text, a 'Forgotten Password' link, and a footer with 'About us | Terms and conditions | Privacy policy | Accessibility | Contact Us' and '©Crown copyright | www.metoffice.gov.uk'.

Enter your User Name and Password and click the Log In button to access StormTracker. Please note that User Names and Passwords are case sensitive. If you have forgotten your user name or password, click on the link at the bottom of the log-in screen to contact our customer centre.

The image shows the main interface of the StormTracker application. The top left features the 'Met Office StormTracker' logo. Below it are tabs for 'Current Storms' and 'Historical Storms'. A list of storm regions is shown: 'Australian', 'South-West Indian', 'BINGIZA', 'North Indian', 'North Atlantic', 'North-East Pacific', and 'North-West Pacific'. The main content area is titled 'About StormTracker' and contains text about advanced versions of the service, a bulleted list of features, and a link to 'Start StormTracker'. The footer includes navigation links like 'About us', 'Terms and conditions', 'Privacy policy', 'Feedback', 'Contact us', and the website 'www.metoffice.gov.uk'.

Using StormTracker *continued*

You also won't need to click through the screen above, as it will not show when you log into your advanced account.

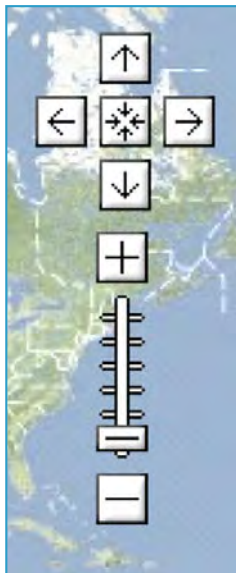
When you first log in to StormTracker, you will see a screen like this:



Using StormTracker *continued*

2. Using the map viewer

Zooming and controlling the map



The map viewer component of StormTracker is based on Google maps, so it can be used in the same way. It consists of a global map that can be explored by clicking and dragging the mouse to move the map, or by using the direction arrows above the scale on the left side of the map.

Zooming in and out can be controlled using the scale on the left hand side of the map – click on the bar on the scale to move it, or click on the scale itself or the plus at the top end or the minus sign at the bottom end to move the bar to the desired zoom level (plus and up the scale is zoom in, minus and down the scale is zoom out). To return to the previous result, click on the box containing four arrows at the centre of the direction arrows.



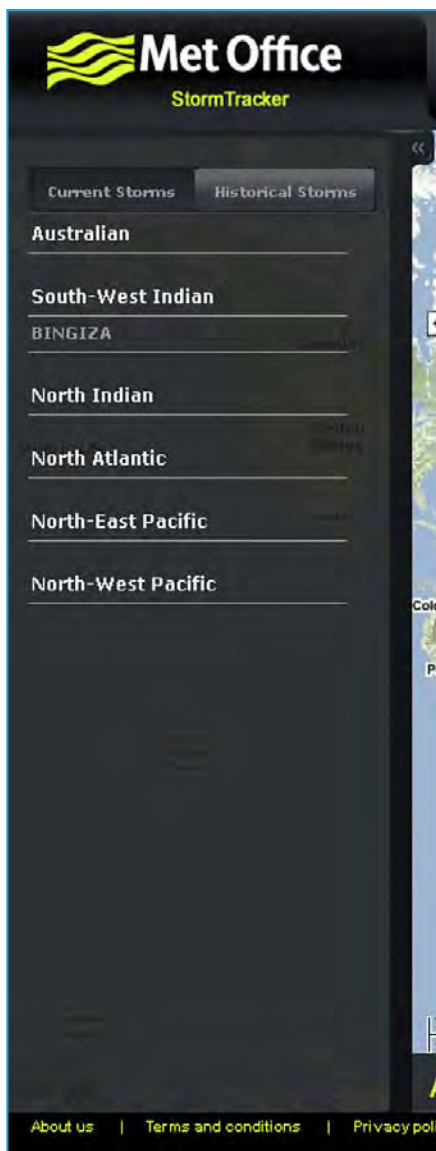
Please note: due to the scale of individual storms, it is not recommended that the map is viewed at a highly zoomed-in level as the forecast and latest weather layers will be of a certain resolution so this will not provide a clear view of the weather. The zoom scale on the map viewer has been limited to prevent the weather layers from becoming unviewable. For further information on resolution of the data in the layers, please see section below on Data provenance.

Using StormTracker *continued*

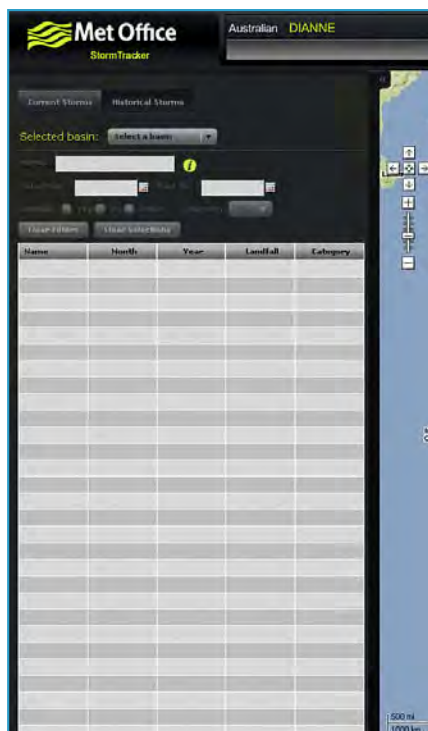
Using the side panel

On the left hand side of the screen, you will notice a panel containing the names of the global basins, underneath are the names of the active tropical storms. It contains two tabs which can be selected to display Current data and Historical data.

Current data tab will look like this:



Historical data tab will look like this:



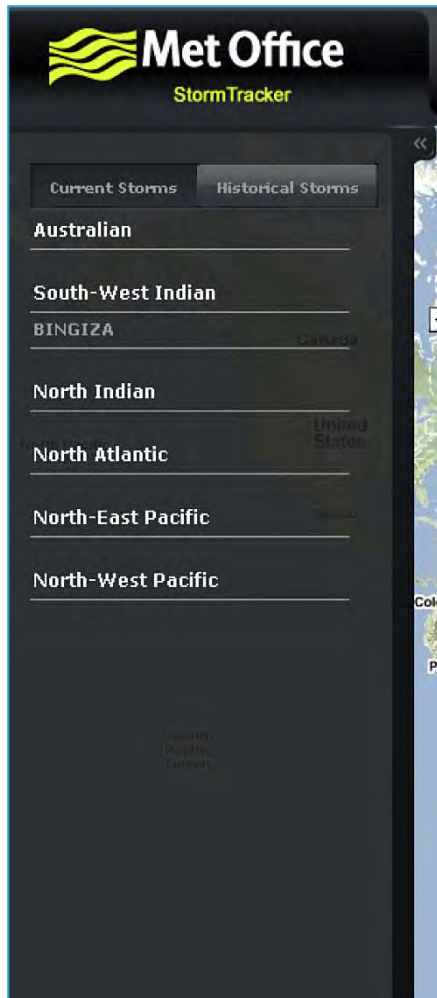
When the historical data tab is selected the map will resize, the floating footer menu will re-centre automatically and the panel will slide out to the right so it is wider.

To remove the side panel from view, click on the arrows at the top left of the panel that point left. When the side panel is reduced, the arrows will remain pointing right. Click on these to restore the side panel.

Using StormTracker *continued*

Selecting storm basins

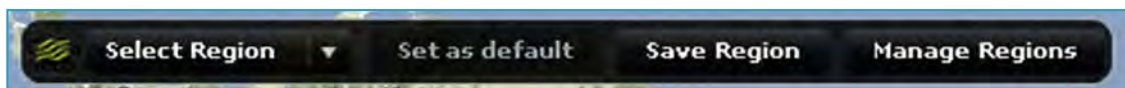
To automatically zoom and move the map to a specific storm basin, you can select the basin by clicking on the basin name on the panel on the left hand side (under the Current data tab).



Using StormTracker *continued*

Selecting and saving personalised regions

It is possible to select and save regions of personal interest by using the floating bar at the bottom of the map viewer.



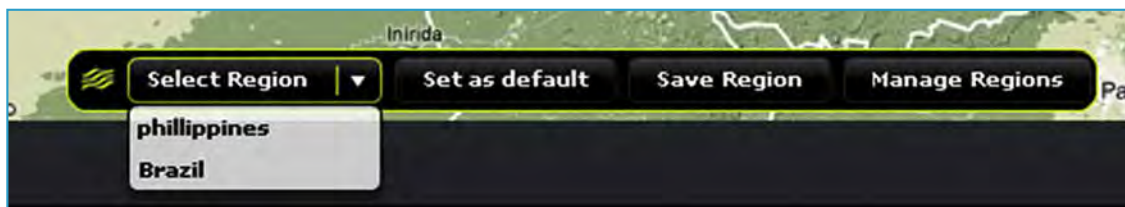
First, move the map using the direction arrows and zoom scale to the region you want to save. Then click on the Save Region button on the floating footer bar. The map will grey out and a pop-up box will appear requesting that you enter a name for the region and asking you to select whether you would like this as your default location.



If you would like to save the region as your default, click on the checkbox next to Is this the default? Then click the Save button. The next time you log on to StormTracker, the map view will automatically be of this region. Please note, you can only have one region selected as a default at any one time.

Using StormTracker *continued*

You can save up to nine regions before you will need to overwrite them. Once you have saved regions, they can be selected using the drop-down menu on the left hand side of the floating footer bar by clicking on the arrow to the right of the drop-down box Select Region and selecting from the list of saved regions. The map will automatically move to the region you have selected from the drop-down menu.



To change your default region, you can use the floating footer bar to make the map go to the region you would like to make your default (using the left-hand drop-down menu of saved regions under Select Region), then click on the Set as default button. Alternatively you can move the map to the desired region, click on Save Region, then click on the default checkbox as per the instructions above. This will automatically change the existing default region to the one displayed currently on the map.

To delete saved regions, click on the Manage Regions button on the right hand side of the floating footer bar. The map will grey out and a box will pop up containing a list of your saved regions. To delete one, select it from the list by clicking on it, and click on the check-box on the right of the table in the column that says Select to delete. Then click on the Update button at the bottom. The region will be removed from the list of saved regions in both the Manage Regions button and the drop-down list of saved regions on the left-hand side of the floating footer bar.

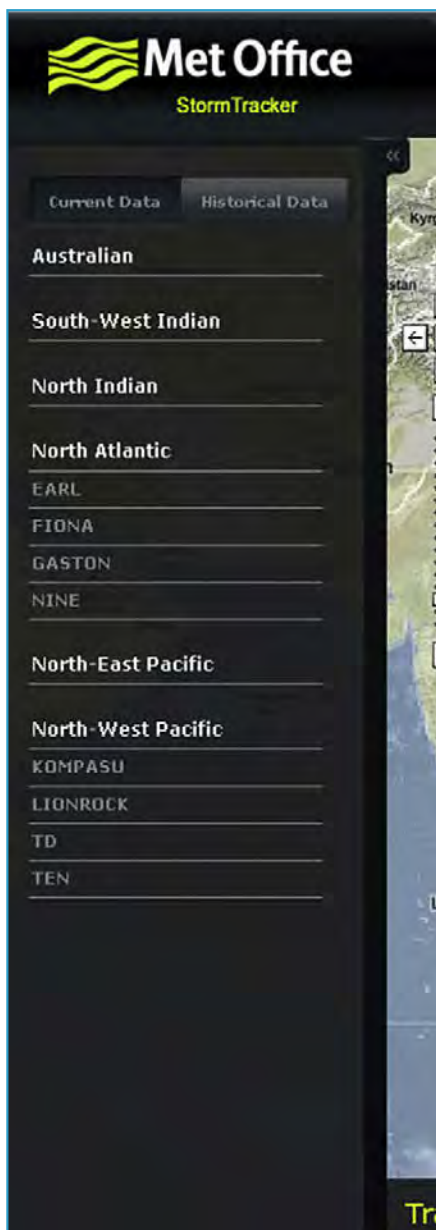



Using StormTracker *continued*

3. Displaying forecast weather

Named storm selection

To see any storm tracks or forecasted weather information for storms, you must first select a storm. On the left hand side of the screen, you will notice a side panel containing the names of the global basins. Underneath are the names of the active tropical storms.



To see what storms are active in the globe, the storm names will be displayed under the basin name in which they are active, and also displayed on the map as this icon: 

If you hover the mouse over the storm icon on the map it will show you the name of the storm so you can select by location, not only the name.

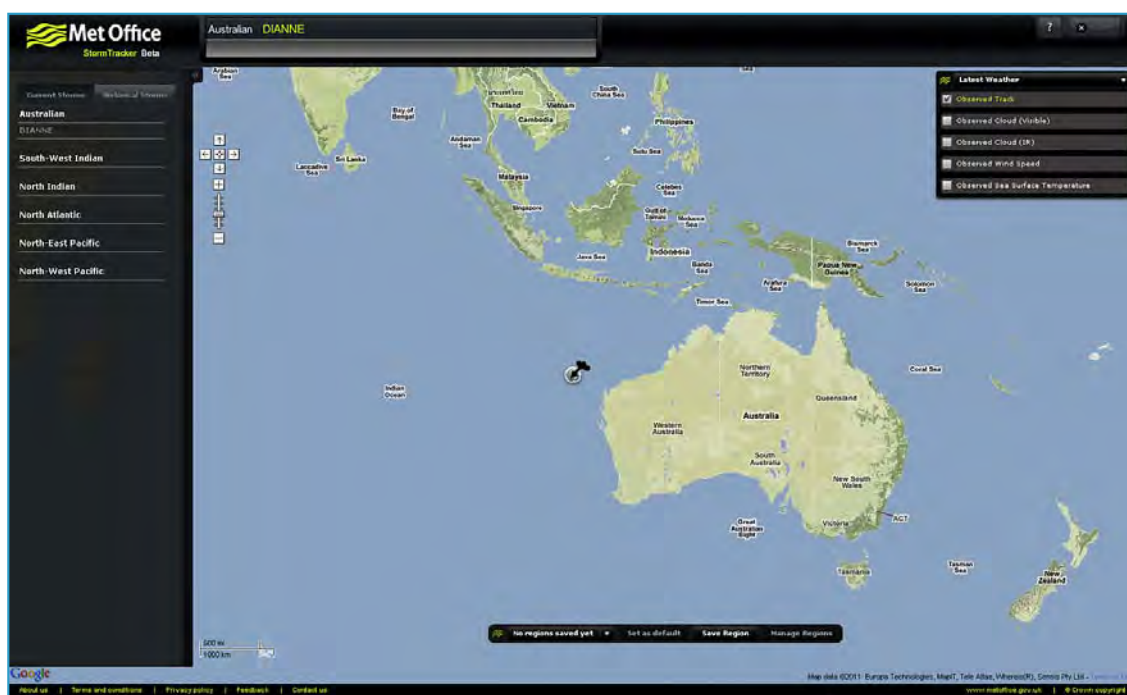
Using StormTracker *continued*

If you hover the mouse over the storm icon on the map it will show you the name of the storm so you can select by location, not only the name.

Where there are no active named storms within a basin, the panel will not show any names beneath the basin name.

There are two ways in which you can view a named active storm in more detail:

- i. Click on the storm icon you are interested in on the map and the map viewer will zoom to the storm (and will display the observed track of the storm as default).
- ii. Click on the name of the storm under the basin heading on the left hand side panel to zoom the map to that storm (and display the observed track of the storm as default).



When you select a storm in the left hand panel, the name of the storm you have selected and the basin you are viewing will appear above the map:



On the right hand side is a floating menu which enables you to pick different layers of current, forecast and asset information. When you select a storm the checkbox beside Latest Weather > Observed Track will automatically be switched on. See later sections for more information on how the layer picker works.

Using StormTracker *continued*

Using the layer picker

The layer picker contains two menus, one for forecast weather and one for latest weather. The advanced version has three (the two mentioned above plus asset layers). To select the forecast weather menu, click on the arrow on the right of the top box and select Forecast weather from the dropdown menu.



Screen tip: click on the Met Office logo to drag and reposition the layer picker and other pop up menus in a convenient place.

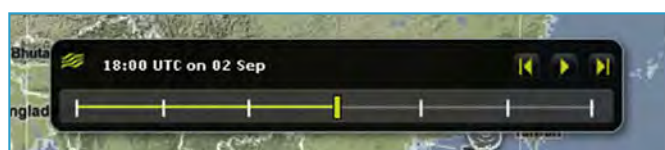
Using StormTracker *continued*

The forecast weather layer shows a menu of storm features that can be displayed on the map viewer. These are listed in light grey bars. The models available for that storm feature will drop down automatically when the storm feature has been clicked on.

To select and display on the map viewer the different forecast models available for a particular storm feature, click on the checkboxes next to the model names. To unselect a layer, click on the checkbox again to remove the tick. To remove all selected layers for a storm feature, click on the checkbox next to the storm feature in the grey bar.

Animated layers

When selecting some weather types (such as cloud) or storm features (such as forming storms) a floating control panel will appear over the map viewer. This control panel can be used to control the animation of the layer as it moves through the forecasted times. There are controls on the top right that will rewind, fast-forward, pause and play and a sliding scale beneath.



Two smaller scales will appear to enable you to control both the speed of the animation and the length of time spent dwelling on each image in the animation sequence. Moving the bars on these scales to the right will increase the speed and dwell time of the animation, and to the left will decrease them.



To see a smooth animation all time steps need to load first. This takes a few moments to load before the animation smoothes out.

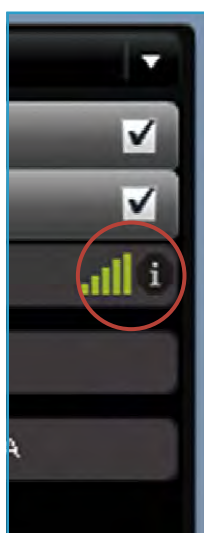
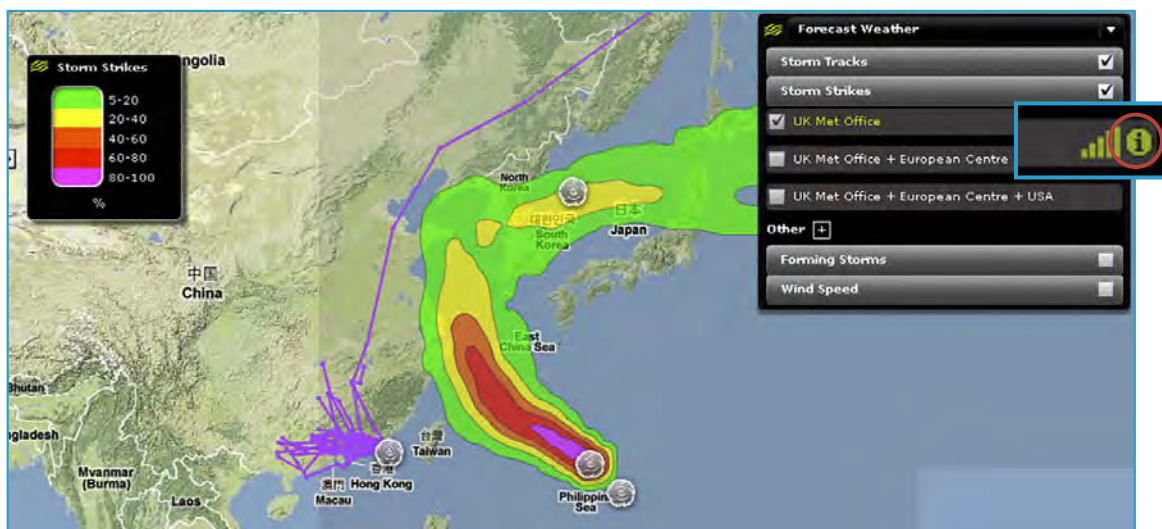


Screen tip: time steps will be expressed in Universal Time Continuum (UTC), which is equivalent to Greenwich Mean Time (GMT) or Zulu time (Z).

Using StormTracker *continued*

Information buttons

Next to each forecast model type in the layer picker is an information button (i) that when clicked or hovered over will display a key to the information.



Layer opacity

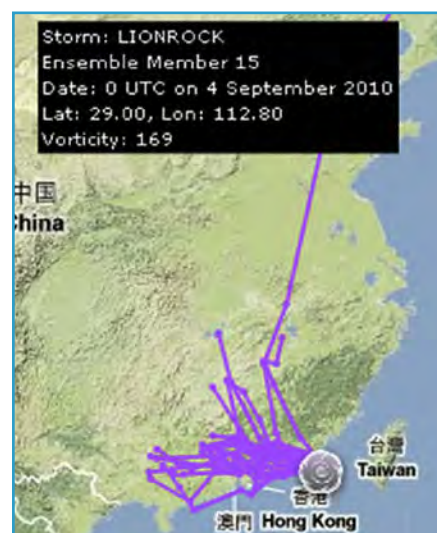
Clicking on the bar-chart symbol to the right of the layer name changes the opacity of a layer.



Missing layers

When data is not available for a layer, a yellow or red triangle will be displayed adjacent to the checkbox next to the model data label in the layer picker.

If the data for a layer that is not a storm track is missing, the map viewer will show red tiles with a message saying "no tile data available".



Storm track information

A pop up information box will appear when you hover the mouse over the points on the forecast tracks. The box will contain information for the storm track at that position. The information varies depending on what type of track is being displayed.

Displaying latest weather

4. Displaying latest weather

Using the layer picker

To select the latest weather menu in the layer picker, click on the arrow on the right of the top box and select Latest weather from the drop-down menu.

The layer picker will only show the content for which you have registered and subscribed.

Users will see the menu below:



Select the latest weather type you want to display by clicking on the relevant checkbox. To unselect a layer, click again on the checkbox beside the weather layer.

Observed track information

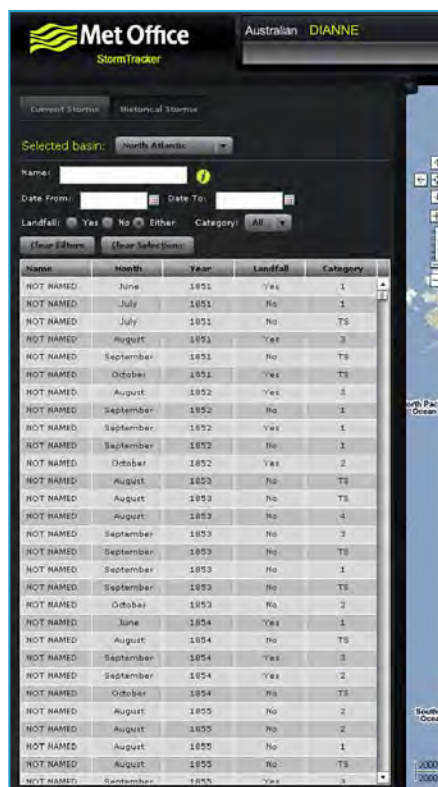
A pop up information box will appear when you hover the mouse over the points on the observed storm tracks and will contain information for the storm track at that position. The information varies depending on the type of track being displayed.



Displaying historical weather

5. Displaying historical weather

Click on the Historical weather tab on the left hand side panel to access a database of previous storms. To select the database for the historic storms, click on the arrow to the right of the box labelled Selected basin and select the basin from the drop-down menu that appears. Please note that only data for the North-East Pacific and North Atlantic basins can be selected as these are the basins for which the data is available (see Data provenance section for further information).



Once you have selected the desired basin, the panel will show a list of storms in a table, with columns for Name, Month, Year, Landfall and Category. The map will re-centre itself based on the new map viewer size and the basin you have selected. Above the table will be boxes for Name, Date from, Date to, radio buttons for Landfall, and a drop-down box for Category.

To go back to the forecast and latest weather layers, click on the tab labelled Current data at the top of the left hand panel.

Selecting and searching the historical storm database

You can select up to three historical storms from the database to show on the map at any one time. Historic storm tracks can be shown alongside any forecast layers that are selected. To select a storm, click on the row containing it on the list. It will be assigned a track colour and its name will appear in the header bar above the map viewer coloured in the track colour.

Black circles over track points on the storm track indicate the strength of the storm.

Displaying historical weather

The screenshot shows the Met Office StormTracker interface. At the top, there's a header with the Met Office logo and 'StormTracker'. Below this, there are tabs for 'Current Storms' and 'Historical Storms'. The 'Historical Storms' tab is selected. On the left, there's a search panel with a 'Selected basin' dropdown set to 'North Atlantic'. Below this are input fields for 'Name', 'Date From', 'Date To', 'Landfall' (Yes/No/Neither), and 'Category'. A table of historical storms is displayed below the search panel. The table has columns for Name, Month, Year, Landfall, and Category. The table lists various storms, including ERIKA, KATINA, and LEE. On the right, there's a map of the North Atlantic showing storm tracks. The map includes labels for various countries and regions, and a legend for storm tracks. At the bottom, there's a footer with links to 'About us', 'Terms and conditions', 'Privacy policy', 'Feedback', and 'Contact us'.

Name	Month	Year	Landfall	Category
ERIKA	July	2005	No	7
KATINA	August	2005	Yes	7
LEE	August	2005	No	7

You can search the database in two ways:

- Use the filters at the head of each column of the table to sort the results. Columns can be sorted on top of each other to enable you to find storms easily based on more than one type of data.
- Alternatively, you can search the database by filling in some or all of the blank boxes above the database to filter the list. Click on the calendar symbol to the right of the Start and End boxes to select dates from the calendar you wish to search between (you don't need to enter dates in both boxes to search up to or from a date). Use the radio buttons to select whether the storm made landfall. Enter the storm name if you know it. Maximum storm category can be selected from the drop-down menu by clicking on the arrow on the right of the box.

This screenshot shows a closer view of the search filters and the top of the table. The 'Selected basin' dropdown is set to 'North Atlantic'. The 'Name' field is empty. The 'Date From' and 'Date To' fields are empty. The 'Landfall' radio buttons are set to 'Neither'. The 'Category' dropdown is set to 'All'. Below the filters are two buttons: 'Clear Filters' and 'Clear Selections'. The table header is visible at the bottom, showing columns for Name, Month, Year, Landfall, and Category.

To clear the filters or selections, click on the buttons just above the table.

Data provenance and guidance

StormTracker includes information from several different models and sources to enable you to build a complete picture of what is happening. This information is split into different types: Forecast weather, Latest weather and Historic weather. Under each of these headings below are the data sources, the data types, usual availability times and the guidance on using and interpreting it appropriately.

1. Forecast weather

Ensemble forecast models

An ensemble forecast is where a forecast model is run many times using very slightly different starting conditions to represent the uncertainty inherent in our understanding of the current state of the Earth's atmosphere. The outcomes are all different, and represent more accurately the range of possible outcomes in terms of probability. This enables decisions to be taken based on a number of potential scenarios.

a. Data sources

Three global ensemble forecasts are used in StormTracker: UK Met Office, European Centre, and USA.

Label	Description	Frequency	Resolution	No of members	Leadtime
UK Met Office	Met Office data is provided from the Met Office Global Regional Ensemble Prediction System (MOGREPS-15) medium-range model	Run 12 hourly to 15 days ahead (31 timesteps), 00Z and 12Z	60 km 70 vertical levels	24	15 days
European Centre	European Centre data is provided from the European Centre for Medium-range Weather Forecasting (ECMWF) Ensemble Prediction System (EPS)	Run 12 hourly to 15 days ahead (31 timesteps), 00Z and 12Z	32 km (days 1-10); 64 km (days 10-15) 62 vertical levels	51	15 days
USA (under 'other')	USA data is provided from the National Oceanic and Atmospheric Administration (NOAA)'s National Centers for Environmental Prediction (NCEP) Global Forecast System (GFS) model	Run 12 hourly to 15 days ahead (61 timesteps)	70 km 28 vertical levels	21	15 days

Data provenance and guidance

The data are also available in these multi-model combinations:

UK Met Office + European Centre	Data is provided as a mean of the data from: the Met Office Global Regional Ensemble Prediction System (MOGREPS-15) medium range model and the data from the European Centre for Medium range Weather Forecasting (ECMWF) Ensemble Prediction System (EPS).
UK Met Office + USA	Data is provided is a mean of the data from: the Met Office Global Regional Ensemble Prediction System (MOGREPS-15) medium range model and the data from the National Oceanic and Atmospheric Administration (NOAA)'s National Centers for Environmental Prediction (NCEP) Global Forecast System (GFS) model.
European Centre + USA	Data is provided is a mean of the data from: the European Centre for Medium range Weather Forecasting (ECMWF) Ensemble Prediction System (EPS) and the National Oceanic and Atmospheric Administration (NOAA)'s National Centers for Environmental Prediction (NCEP) Global Forecast System (GFS) model.
All	Data provided is a mean of three models: the data from the Met Office Global Regional Ensemble Prediction System (MOGREPS-15) medium range model; the data from the European Centre for Medium range Weather Forecasting (ECMWF) Ensemble Prediction System (EPS) and the National Oceanic and Atmospheric Administration (NOAA)'s National Centers for Environmental Prediction (NCEP) Global Forecast System (GFS) model.

Data provenance and guidance

b. Data types

Ensemble forecast information is provided for:

Label	Display	Definition
Ensemble storm tracks	Individual ensemble member storm tracks shown, i.e. one track per ensemble member for each single model. Multi-model combinations not available.	The ensemble storm tracks show the forecasted positions for each ensemble member of a named storm for every 12 hour timestep up to 15 days ahead.
Ensemble mean storm tracks	One ensemble mean track shown for each model and multi-model combination.	The ensemble mean storm track shows the mean forecasted positions of the mean of all the individual ensemble members for every 12 hour timestep up to 15 days ahead.
Strike probability	One strike probability plume shown for each model and multi-model combination (based on ensemble storm tracks of a named storm).	The probability of the centre of a named storm passing within a 75 mile radius of any location on the map for every 12 hour timestep up to 15 days ahead.
Forming storm probability	Probability of any storm, either pre-existing or forming within the forecast period shown in animation for each model and multi-model combination.	The probability of a storm centre passing within approximately 190 miles (300 km) of a location for every 12 hour timestep up to 15 days ahead.
Wind speed	Only available for Met Office Global Regional Ensemble Prediction System (MOGREPS-15) model. Wind speed probabilities shown for entire basin selected.	The probability of 10 m sustained wind speed exceeding a threshold of 39 mph, 50 knots (58 mph), 74 mph for every 12 hour timestep up to 15 days ahead. Note that this will estimate the large-scale flow around storms but should not be expected to represent the strongest winds close to the storm centre.

* Information highlighted in grey is available to certain users only, and only for the Met Office Global Regional Ensemble Prediction System (MOGREPS-15) model.

Data provenance and guidance

c. Usual availability times

Please note times expressed are in Zulu time (Z)/Coordinated Universal Time (UTC)/Greenwich Mean Time (GMT). Daylight savings or British Summertime are not expressed so you will need to account for this when using StormTracker. The 00Z (Midnight) model run is expressed first, followed by the 12Z (Midday) run.

Source	Type	Available (00Z run, 12Z run)
UK Met Office	Ensemble storm tracks	09:55, 21:55
	Ensemble mean storm tracks	09:55, 21:55
	Strike probability	09:10, 21:10
	Forming storm probability	09:30, 2130
	Wind speed	09:10, 2110
European Centre	Ensemble storm tracks	09:55, 2155
	Ensemble mean storm tracks	09:55, 2155
	Strike probability	14:00, 0200
	Forming storm probability	14:00, 0200
USA (Other)	Ensemble storm tracks	07:40, 1940
	Ensemble mean storm tracks	07:40, 1940
	Strike probability	08:20, 2020
	Forming storm probability	07:30, 1930
UK Met Office + European Centre	Ensemble mean storm tracks	11:25, 23:25
	Strike probability	11:05, 22:05
	Forming storm probability	13:40, 01:40
UK Met Office + USA	Ensemble mean storm tracks	11:25, 23:25
	Strike probability	11:05, 22:05
	Forming storm probability	14:00, 02:00
European Centre + USA	Ensemble mean storm tracks	11:25, 23:25
	Strike probability	11:05, 22:05
	Forming storm probability	15:00, 03:00
All	Ensemble mean storm tracks	11:25, 23:25
	Strike probability	11:05, 22:05
	Forming storm probability	15:00, 03:00

Data provenance and guidance

d. Guidance on interpretation of ensemble forecasts

Ensemble modelling is a commonly accepted method of quantifying the possible spread of outcomes of a forecast, and is very useful for understanding various different scenarios that might develop. It is best used to provide general guidance on the possible ways a situation may develop, and the relative likelihood of different outcomes, and should not be used on its own to formulate a single definitive decision based on one outcome occurring. If you would like to access expert advice from Met Office forecasters to help you, please contact stormtracker@metoffice.gov.uk.

To understand the single most likely outcome for life-and-limb or operational decisions please refer to the official guidance available at these websites:

Regional Specialised Meteorological Centres

National Hurricane Center, Miami (Caribbean Sea, Gulf of Mexico, North Atlantic and eastern North Pacific oceans east of 140° W)

Japan Meteorological Agency, Tokyo (Western North Pacific Ocean from Malay peninsula to 180° E)

Indian Meteorological Department, New Delhi (Bay of Bengal and the Arabian Sea)

The Central Pacific Hurricane Center, Honolulu, Hawaii (North Pacific Ocean 140-180° W)

Météo France à La Réunion (South Indian Ocean from African coast to 90° E)

Meteorological Service, Nadi, Fiji (South Pacific Ocean east of 160° E and north of 25° S)

Other tropical cyclone warning centres

The Bureau of Meteorology, Australia (Southern hemisphere 90-160° E)

MetService, Wellington, New Zealand (South Pacific Ocean east of 160° E and south of 25° S)

Joint Typhoon Warning Center, Pearl Harbor, Hawaii (West of 180° E)

Canadian Hurricane Centre, Halifax, Canada (Canadian Atlantic shores)

Dynamical modelling has shown excellent results for forecasting a wide range of weather systems, but skill in identifying and predicting smaller-scale features (including tropical storms) is less than for larger-scale weather patterns (such as extra-tropical depressions), mainly due to spatial resolution limitations of the models. In particular the global ensemble systems the Met Office uses for StormTracker cannot resolve the fine-scale detail within tropical storms, particularly the intensity and localisation of the strongest winds and heaviest rain associated with these systems. However they do have well-demonstrated skill in predicting the tracks followed by storm systems.

Some storm tracks are more predictable than others, depending on the general atmospheric environment within which the storm develops, and the ensemble approach provides an estimate of the predictability for each storm. Weather forecasting is inherently a chaotic science, and errors and uncertainty increase as the forecast time ahead increases. It is advised therefore that StormTracker is not used to make single definitive decisions but as a general guide to show the range of possible outcomes for a given weather situation.

Guidance on wind speed ensemble data

While dynamical ensemble models are skilful at resolving global-scale weather types and patterns, the spatial resolution of the Met Office global model is not sufficient to properly resolve smaller-scale individual storm feature characteristics of wind that are directly associated with a specific storm feature, and is likely to underestimate the actual outcomes. As such, it is advised that the wind speed layer provided is used to inform a view of the general weather situation, not to understand or predict the actual impacts from wind speed for forecast storms. Note that this will estimate the large-scale flow around storms but should not be expected to represent the strongest winds close to the storm centre.

Data provenance and guidance

Guidance on vorticity in ensemble forecast data

Vorticity (included in the tool tips for ensemble mean and ensemble forecast tracks) is used by meteorologists as one of many parameters to inform measures of storm strength but when taken in isolation is not suitable for decision-making. To understand storm strength it is recommended that the UK deterministic five-day forecast track tool tips are used, as the strength categories on this layer have been interpreted by forecasters (see section on guidance below).

Deterministic forecast model

A deterministic forecast is a forecast expressed in terms of only one outcome that is likely to happen – a definitive answer that gives no view of the other possible scenarios that might occur.

a. Data source

Label	Description	Frequency	Resolution	Leadtime
Met Office	Met Office data is provided from the Met Office Global Deterministic model with additional forecaster intervention	6 hourly	25 km	5 days

This information is also available in text format from our Tropical Cyclone guidance messages at: www.metoffice.gov.uk/weather/tropicalcyclone/warnings

This five-day forecast track also includes the latest positions of the storm in black.

b. Data type

The five-day storm track comes from the Met Office Global Deterministic model which predicts out to five days ahead. This storm track is produced by running the forecast model output through the Met Office storm track software to give points in the track, latitude, longitude and a measure of strength (vorticity). Forecasters then look at this information and amend it based on their expert understanding of the model and its performance, and add categories to interpret the data to say whether the storm is strong, medium or weak, and whether it is strengthening or weakening. The information is then included in StormTracker in the information box that appears when the mouse is hovered over the points on the storm track.

c. Usual availability time

The data is usually made available only when storms are active, and every 12 hours (00Z and 12Z runs respectively). You should expect the tracks to be available from 09:00 and 21:00 UTC. (See 1.c for more information.)

d. Guidance on interpretation of deterministic forecasts

The Met Office issues tropical cyclone guidance messages and storm tracks twice per day based on information from its global model forecasts. The deterministic five-day forecast provided in StormTracker has been interpreted and checked by expert Met Office forecasters before it is displayed. However, these are not official tropical cyclone forecasts and therefore should not be used exclusively to make decisions which will affect life or property. Refer to forecasts issued by one of the RSMCs (below) for official forecast information. Also note that the messages are only routinely issued during the stated seasons, although guidance is issued out of season if a storm is active or forecast.

Data provenance and guidance

The messages are primarily designed to give an indication of the Met Office global model's forecast track of tropical cyclones, which are known to exhibit some skill. Explicit forecasts of maximum wind speed are not given as the model (at its current resolution) cannot resolve the wind field with sufficient detail. However, a qualitative indication of forecast wind strength is given based on the model's relative vorticity field (at the 850 hPa level).

Regional Specialised Meteorological Centres

National Hurricane Center, Miami (Caribbean Sea, Gulf of Mexico, North Atlantic and eastern North Pacific oceans east of 140° W)

Japan Meteorological Agency, Tokyo (Western North Pacific Ocean from Malay peninsula to 180° E)

Indian Meteorological Department, New Delhi (Bay of Bengal and the Arabian Sea)

The Central Pacific Hurricane Center, Honolulu, Hawaii (North Pacific Ocean 140-180° W)

Météo France à La Réunion (South Indian Ocean from African coast to 90° E)

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Joint Typhoon Warning Center, Pearl Harbor, Hawaii (West of 180° E)

Canadian Hurricane Centre, Halifax, Canada (Canadian Atlantic shores)

2. Latest weather

Latest weather data is data that is fed into StormTracker from observations sources the Met Office collates from around the world. It represents what has happened in the recent past, and will be overwritten when new data is available.

a. Data sources

There are four sources of latest weather information available in StormTracker:

Label	Source	Type	Frequency	Resolution
Cloud — IR	Global Satellite composite	Latest high resolution infra-red satellite global composite	3 hourly	Approx 16 km on Equator
Cloud — visible	Global Satellite composite	Latest high resolution visible satellite global composite	3 hourly	Approx 16 km on Equator
Sea surface Temperature	Forecast Ocean Assimilation Model (FOAM)	Latest global observed sea surface temperature from 5 metre depth	12 hourly	40 km
Wind speed	Synops / buoys	Latest global wind speed and direction	1/3/6 hourly (depending on reporting station)	N/A (location of reporting station)

b. Data types

See above

Data provenance and guidance

c. Usual availability time

Please note times expressed are in Zulu time (Z) / Coordinated Universal Time (UTC) / Greenwich Mean Time (GMT). Daylight savings or British Summertime are not expressed so you will need to account for this when using StormTracker.

Label	Availability time
Cloud — IR	01:00, 04:00, 07:00, 10:00, 13:00, 16:00, 19:00, 22:00
Cloud — Visible	01:00, 04:00, 07:00, 10:00, 13:00, 16:00, 19:00, 22:00
Sea surface temperature	07:00, 19:00
Wind speed	Recalculates hourly, three hourly or six hourly dependent on new observations arriving

d. Guidance on interpretation of latest weather

Latest weather information comes from the Met Office's range of global observation networks, including satellites and buoys. It provides as complete a picture of the latest weather as possible, bearing in mind the spatial resolution of the observation points.

3. Historic weather

Historical data represents data from storms that have happened in the not-recent past.

a. Data source

Historical data for tropical storms is available for the North Atlantic and Eastern Pacific basins, from 1851 onwards. It is provided from the HURDAT database, which is maintained and provided by the U.S. National Hurricane Centre (NHC), part of the U.S. National Oceanic and Atmospheric Administration (NOAA).

It is updated on an annual basis, hence recent storm tracks, for instance those in the current season, are not available.

b. Data types

Name

For storms in the HURDAT data base, storms from 1851 to 1949 will be unnamed. The naming convention began in 1950. Storms can be selected by name where the storm occurred after 1950.

Data provenance and guidance

Categories for historical storms

These refer to the highest category (strength, measured by sustained wind speed and storm surge) the storm reached in its lifetime. Categories are defined as per the Saffir-Simpson Hurricane Scale and relate to the thresholds for wind speeds and storm surge below:

Category	Wind speed	Storm surge
	Mph (km/h)	Ft (m)
5	≥156 (≥250)	>18 (>5.5)
4	131–155 (210–249)	13–18 (4.0–5.5)
3	111–130 (178–209)	9–12 (2.7–3.7)
2	96–110 (154–177)	6–8 (1.8–2.4)
1	74–95 (119–153)	4–5 (1.2–1.5)
TS (Tropical Storm)	39–73 (63–117)	0–3 (0–0.9)
TD (Tropical Depression)	0–38 (0–62)	0 (0)

Start date (month and year)

The start date for the search. Any tropical storm that occurred on or after this date will be included in the search results. Dates can be selected for months and years from January 1850 until December 2009.

End date (month and year)

The finish date for the search. Any tropical storm that occurred on or before this date will be included in the search results. Dates can be selected for months and years from January 1850 until December 2009.

Landfall

Whether the storm made landfall at any point in its lifetime (i.e. cross the coastline onto land).

c. Usual availability time

Not applicable. Data will be updated with previous year's storms on an annual basis.

d. Guidance on use of historical storm data

Not applicable.

Frequently asked questions

We hope that you will be satisfied with your experience of StormTracker. If you have any queries about the product or its use please refer to the frequently asked questions below to see whether your question is answered. If not and you experience a persistent problem, please contact us using the details below in question 1.

I have no log-in details (user name or password)

Please see online details for how to access StormTracker.

If you have forgotten, lost or have not been sent your log-in details, your user name or password, please contact the customer centre by clicking on the link reading “customer centre” on the log-in screen beneath “Forgotten password?”. Alternatively you can contact us as below:

By phone or fax from the UK

Tel: 0870 900 0100 or 01392 885680

Fax: 0870 900 5050 or 01392 885681

By phone or fax outside the UK

Tel: +44 1392 885680

Fax: +44 1392 885681

By email

enquiries@metoffice.gov.uk

By social media

We can be found on Twitter, Facebook, Flickr and YouTube. More details can be found on our **social media page**.

By post

Met Office
FitzRoy Road
Exeter
Devon
EX1 3PB
United Kingdom

Why can't I see any forecasted weather or storms when I open the map viewer and select from the layer picker?

The map viewer will only display forecasted storms and weather when a storm has been selected. Select a storm by clicking on the storm icon you want to display or pick the name of the storm from the left hand panel under the basin name. Then click on the layer picker to show the forecasted storm information. See **Named storm selection** and **Using the layer picker** for more information.

When I zoom into the area I want to view, the ensemble storm tracks appear to start in different places

Ensemble predictions work by running the model many times with slightly different starting conditions. This will result in a spread in the forecast tracks which enables a probabilistic forecast to be made. Thus as you zoom in, each of the ensemble tracks will appear to start from a slightly different position.

Frequently asked questions

The starting position of the storm tracks and storm strikes do not match up with the storm icon

The storm icon indicates the latest observed position of the storm and is updated every six hours. The ensemble forecast which produces the storm tracks and storm strikes is updated every 12 hours and takes some time to run and the data to be loaded into StormTracker. Thus at certain times of day the start time of the forecast data may be six, 12 or even 18 hours behind the time of the storm icon. Thus there may be a visible discrepancy between the starting position of the storm tracks/strikes and that of the storm icon. See “usual availability times” earlier in the User Guide for an indication of when ensemble forecast data becomes available.

See **Data provenance** section for more detail on model resolution and the characteristics of ensemble modelling.

Why is there missing data? When can I see it?

StormTracker is handling data from lots of different sources and from several different centres of weather forecasting expertise. The individual models do not run at the same time as each other. This means that data will be available for one model before the others become available. The multi-model combinations in particular take longer to process than individual models so arrive later. For more information on expected arrival times, see **Data provenance** section.

If data is late or not available (the model has not run, or not run on time) it will be supplied when it becomes available from the model. If there is a problem with the application this can take longer to fix. See **Selecting model run** for more information.

Please note that all forecasts will only be displayed if there is an active storm for the basin or region you are looking at and you have selected it. If there are no active storms, forecasts cannot be displayed. See **Named storm selection** for more information.

StormTracker is a brand new product in beta-testing mode, and as such is likely to experience some glitches and small problems. Our terms and conditions and licenses reflect the service levels you can expect, so please refer to these if you are unsure.

Please note that the Met Office can accept no responsibility for the completeness or delivery to us of data supplied by other modelling centres and strongly advises that you read and accept your terms and conditions carefully.

What can I use StormTracker for?

StormTracker is not designed for use for decision-making where there is a risk to life and limb. It is designed to give a fuller picture than other storm tracking software available, by showing several models in one place and many different scenarios of how the weather will evolve. This is useful if you are making financial or business decisions based on many possible scenarios happening.

The Met Office strongly advises that if you need to make a decision on storm information that could affect safety, you visit the website of the meteorological centre for the region you are interested in. A list of these can be found on our public website at: www.metoffice.gov.uk/weather/tropicalcyclone/warnings

Please see the section on **Data provenance** for guidance on the accuracy, limitations and advised use of the information in StormTracker.

Please note that the Met Office can accept no responsibility for the accuracy or content of data supplied to us by other modelling centres and strongly advises that you read your terms and conditions carefully.



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